

ABSTRACT OF THE DISCLOSURE

5 "IMPROVEMENTS IN A MODULAR FRUIT JUICE EXTRACTION  
SYSTEM," an invention for the purpose of extracting high  
quality fruit juice from citrus and other round or oval  
shaped fruit, based on a basic module configured by a  
structural chassis (1) and composed of two fixed peeler  
cups (3) attached to a structural chassis (1) and two  
matching moveable peeler cups (4), one pair of peeler  
cups (3) and (4), each located at opposite ends of the  
10 machine, where the moveable peelers cups (4) are each  
attached at an opposite end of a linear actuator (2),  
which can employ various drive technologies, including  
hydraulic, pneumatic, electric, geared, screw and/or any  
combination of known linear drive systems that, in a back  
15 and forth cycle, drives both movable peeler cups (4). The  
system is composed of a moveable peeler cup (4) at each  
of the extreme ends of the linear actuator (2), driven in  
a manner that maximizes the productivity of the drive  
motion, since when one peeler cup (4) is opening to allow  
20 a fruit (19) to fall within its concave and radially cut  
chamber, formed in conjunction with its matching pair  
fixed peeler cup (3), at the same time, the moveable  
peeler cup (4) at the opposite end is closing upon the  
fruit (19) inside the chamber and shearing the fruit's  
25 skin (12) as it initiates the peeling process and as it  
continues on to complete the juicing cycle by pumping the

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fruit's core (13) into the filtering device (7) and, since this filtering device has a circular sharp cutting point at its forward opening, it permits the fruit's core (13) to enter completely into the filter (7), which has

5 radially cuts slits which allow for the extracted juice (11) to flow through and be collected in the space formed by the inside of the fixed peeler cup (3) and the juice collector (10), followed by the motion of plunger (8) which travels through the filter and pushes directly

10 on the fruit's core (13) until said core is expelled completely from the forward end of the filter and, finally, the dried fruit core falls into and through the chamber formed by the fixed (3) and moveable (4) peeler cups, and is directed to further fall through the fruit

15 core receiving duct (14), in a manner so that all of these by-products being produced: juice (11), peel (12) and core (13), can now be directed separately to other stages of processing. Three possible versions can be deployed for actuating the plunger (8), but in all cases,

20 the objective is to drive said plunger (8) to travel through the filter and to push directly on the fruit's core (13) until said core is expelled completely from the forward end of the filter and, finally, the dried fruit core falls into and through the chamber formed by the

25 fixed (3) and moveable (4) peeler cups, and is directed to further fall through the fruit core receiving duct

(14), in a manner so that all of these byproducts being produced: juice (11), peel (12) and core (13), can now be directed respectively to other stages of processing. In all versions, clean-in-place spray nozzles (21) are mounted at different positions on structural chassis (1), in a manner such that, liquid and/or vaporized sprays can be utilized automatically, controlled by computer or other methods, for automatic cleaning of the machine at predetermined time periods as deemed necessary. With the moveable peeler cup (4) in the full open position, the machine is ready to commence another fruit juice extraction cycle. Since the configuration is symmetrical as shown in Figures 1 through 5, the pair of peeler cups (3) and (4) at one end of the machine will be exactly 180 degrees out of phase with respect to the pair of peeler cups at the opposite end of said machine. At either end of the machine, or, at either pair of peeler cups (3) and (4), the juice extraction cycle is exactly identical.

"IMPROVED CONFIGURATION FOR A SELF-CLEANING FILTER WITH REMOVABLE PERFORATING POINT FOR THE EXTRACTION OF FRUIT JUICE," consisting of a cylindrical filter (50) having a body (51) constructed of stainless steel or other food grade, nontoxic materials, where at one extreme end a removable cylindrical perforating cutting edge (52) is attached, by threads or other methods, and is constructed so as to terminate in a sharp knife edged

circular point (53), which functions by first perforating the fruit's peel in a manner such that permits the pumping action of a moveable peeler cup (4) (a concave and radially cut hemisphere) to force a core section of fruit (C) to enter completely into said filter (7 or F), and since the main body (51) of the filter is of a tubular cylindrical shape and is configured to have a multitude of transverse radial slits (54) with conical, or V-shaped, format, positioned parallel with respect to each other (55), and which can be spaced and sized variably, dependent on the juice (J) can produce many juice products with varying desired characteristics. The nature and numbers of the multitude of transverse radial slits (54) with conical, or V-shaped, generate greater efficiency and yield in juice extraction, due to a pressure differential between the inside and outside portions of the filter, in fact, inducing a "Venturi Effect" which accelerates juice flow from the inside to the outside of the filter, thus promoting greater juice (J) yield and greater productivity by helping to maintain the passageway clear of obstructions and reducing clogging and cleaning frequency. The proposed invention functions by first perforating the fruit's peel in a manner such that permits the pumping action of a moveable peeler cup (4) against a fixed peeler cup (3) forces a core section of fruit (C) to enter completely into said

filter (F), where simultaneously, due to the high pressure generated by the action, the juice (J) is forced to flow through the multitude of conically shaped transverse radial slits that are positioned parallel with respect to each other, thus separating and filtering the liquid juice (J) from solid components of the fruit's core (C). The removable cylindrical perforating cutting edge (52) simplifies replacement and permits for interchangeability with differently shaped cutting edges which can vary as desired in order to obtain greater juice (J) extraction performance, or higher juice quality, from the many varieties of citrus and other fruit.

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